

REMARKS

The present Amendment amends claims 1, 2, 6, and 11, and leaves claims 3-5, 7 and 8 unchanged. Therefore, the present application has pending claims 1-8 and 11.

Claim 2 stands rejected under 35 USC §112, first paragraph as allegedly failing to comply with the enablement requirements. Amendments were made to claim 3 to more clearly recite as described in the specification, for example on page 4, lines 7-16, that the first storage apparatus sorts the data into the groups based on a recovery time required for recovering data. Thus, claim 2 complies with the enablement requirements of 35 USC §112, first paragraph. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Claims 1, 3-5, 7, 8 and 11 stand rejected under 35 USC §103(a) as being unpatentable over Kodama (U.S. Patent No. 6,725,549 B2) in view of Tamatsu (U.S. Patent Application Publication No. 2003/0074600 A1). This rejection is traversed for the following reasons. Applicants submit that the features of the present invention as now more clearly recited in claims 1, 3-5, 7, 8 and 11 are not taught or suggested by Kodama or Tamatsu whether taken individually or in combination with each other as suggested by the Examiner. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Amendments were made to the claims to more clearly describe features of the present invention as recited in the claims. Particularly, amendments were made to the claims to more clearly recite that the present invention is directed to a computer system including a first storage apparatus

located at a first site and a second storage apparatus located at a second site, which is operatively connected to the first site via a network.

According to the present invention the first storage apparatus is configured to sort data stored in the first storage apparatus into groups which are each assigned a priority level and to transfer the sorted data to the second storage apparatus according to the priority levels.

Further, according to the present invention when a failure occurs in the first storage apparatus, the second storage apparatus transfers the sorted data stored therein, in an order according to the priority levels assigned to the groups, to the first storage apparatus to recover the first storage apparatus such that sorted data having a highest priority level is transferred from the second storage system to the first storage system first.

As shown in, for example, Fig. 6 of the present application, a primary site 100 sorts data stored therein into one or more groups, which are each assigned a priority level, and transfers the sorted data to a secondary site 102 according to the assigned priority. The sorted data may be transferred in either synchronous copy mode or asynchronous copy mode with data of the highest priority being transferred in the synchronous mode. The secondary site 102 stores the duplicated data therein in the same manner as the primary site 100. The priority levels assigned to the groups also define the order in which data of the groups are transferred to the primary site 100 when data recovery is required with data of the highest priority being transferred first.

Thus, according to the present invention as recited in the claims, in a process of recovering data in the primary site 100, the secondary site 102 transfers the data stored therein to the primary site 100 in a group-by-group

basis according to their respective priority levels with the highest priority levels being transferred first.

The above described features of the present invention now more clearly recited in the claims are not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, the above described features of the present invention now more clearly recited in the claims are not taught or suggested by Kodama or Tamatsu whether taken individually or in combination with each other as suggested by the Examiner.

Kodama, contrary to the allegations made by the Examiner, fails to teach or suggest the above described features of the present invention as recited in claims 1 and 2. Kodama merely discloses that a data storage system includes a local storage facility and a remote storage facility configured to form pairs of storage areas (i.e., local storage areas and remote storage areas), wherein each of the pairs is given a priority level.

Specifically, as shown in Figs. 2 and 3 of Kodama, pairs of storage areas are given a priority level. As per Kodama, in a process of writing data in response to an I/O request from a server 24, the local storage facility 12 makes a remote copy request based on the priority level if the data is found to be a pair of remote copy, and then places the remote copy request into an RC queue 44. Thus, as per Kodama, the remote copy request in the RC queue 44 is retrieved in order of the priority level thereof, and, as a consequence, the data associated with the retrieved remote copy request is sent to a remote storage facility 12 according to its indicated priority level.

Attention is directed to Figs. 6 and 8. It is noted that in Kodama the data to be written is simply transferred from the local storage facility 12 to the remote storage facility 12. There is no teaching or suggestion in Kodama that the remote storage facility 12' transfers data from the remote storage facility 12' to the local storage facility 12 to recover the local storage facility 12 in an order according to the priority levels of groups of data to be transferred as in the present invention. Kodama merely states that "the servers 224' of remote storage facility 212 [...] may optionally be included for failover purposes [...]." See col. 8, lines 7-14 of Kodama. Accordingly, the remote storage facility 12 of Kodama is not the same as, or equivalent to, nor does it perform the same functions, as the second storage apparatus of the present invention as recited in the claims. The second storage apparatus of the present invention transfers data in groups from the second (remote) storage apparatus to the first (local) storage apparatus in an order corresponding to the priority levels assigned to the respective groups.

In addition to the above noted deficiencies, in the Office Action the Examiner readily admits that Kodama does not teach or suggest that the primary storage system performs the failure processing as recited in the claims. According to the present invention when a failure occurs in the first storage apparatus, the second storage apparatus transfers the sorted data stored therein, in an order according to the priority levels assigned to the groups, to the first storage apparatus to recover the first storage apparatus such that sorted data having a highest priority level is transferred from the second storage system to the first storage system first. Such features are as admitted by the Examiner not taught or suggested by Kodama.

The Examiner attempts to supply this deficiency of Kodama by combining Kodama with Tamatsu. However, Tamatsu does not supply the deficiencies of Kodama. Therefore combining the teaching of Kodama and Tamatsu in the manner suggested by the Examiner in the Office Action still does not teach or suggest the features of the present invention as recited in the claims.

In the Office action the Examiner points to paragraph [0215] of Tamatsu. Paragraph [0215] of Tamatsu teaches that the disclosed apparatus:

“allows list output and the execution of other referential batch processing without suspending on-line processing. Since methods extant in the prior art perform the creation of month-ahead reports and other such batch processing with on-line processing suspended and unable to perform data updates, continuous on-line processing has been problematic. The present invention achieves continuous on-line processing by halting the updating of the backup on the secondary system at some specified point in time. A message that backups will be temporarily suspended is transmitted from the primary system to the secondary system, and the secondary system then receives subsequent logs but does not perform backups. If transmissions are synchronous, tightly-coupled transmissions, the primary system unlocks data when it receives a message from the secondary system that the backup has been completed, and this applies likewise to asynchronous, loosely-coupled transmission. After receiving from the secondary system a message that backup has been completed, referential batch processing is launched. When referential batch processing is completed, the secondary system resumes updating backups, whether by explicit instruction or automatically, on the basis of the logs accumulated. When the secondary system runs out of logs accumulated for backup updates, the secondary system transmits to the primary system a message to release the suspended status of backups and returns to regular backup mode. Since the primary system and the secondary system will be temporarily unsynchronized if this method is applied, multiple secondary systems should be provided if data integrity is the top priority”.

As is clear from the above there is absolutely no teaching or suggestion as to the processes that are to be performed by the primary and secondary systems when a failure occurs as in the present invention. Further, there is no teaching or suggestion as to when a failure occurs that the secondary system transfer data to the primary system according to its assigned priority level as in the present invention. As per the above Tamatsu simply teaches that "the secondary system transmits to the primary system a message to release the suspended status of backups and returns to regular backup mode". As per Tamatsu this type of processing is important so that other kinds of processing can be performed without substantially affecting normal backup processing. This type of processing has nothing what so ever to do with failure and recovery processing as in the present invention.

In addition to the above amendments were made to the claims to further clarify the features of the present invention. Particularly amendments were made to the claims to more clearly recite that the first storage apparatus transfers the sorted data to the second storage apparatus according to the indicated priority levels and that the sorted data having the highest priority level is transferred from the second storage apparatus to the first storage apparatus first. These features are surely not taught or suggested by either Kodama or Tamatsu.

Thus, both Kodama and Tamatsu fail to teach or suggest that the first storage apparatus is configured to sort data stored in the first storage apparatus into groups which are each assigned a priority level and to transfer the sorted data to the second storage apparatus according to the priority levels as recited in the claims.

Further, both Kodama and Tamatsu fail to teach or suggest that when a failure occurs in the first storage apparatus, the second storage apparatus transfers the sorted data stored therein, in an order according to priority levels assigned to the groups, to the first storage apparatus to recover the first storage apparatus as recited in the claims.

Still further, both Kodama and Tamatsu fail to teach or suggest that sorted data having a highest priority level is transferred from the second storage system to the first storage system first as recited in the claims.

Therefore, since both Kodama and Tamatsu suffer from the same deficiencies relative to the features of the present invention as recited in the claims, combining the teachings of Kodama and Tamatsu in the manner suggested by the Examiner in the Office Action does not render obvious the features of the present invention as now more clearly recited in the claims. Accordingly, reconsideration and withdrawal of the 35 USC §103(a) rejection of claims 1, 3-5, 7, 8 and 11 as being unpatentable over Kodama in view of Tamatsu is respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the references utilized in the rejection of claims 1, 3-5, 7, 8 and 11.

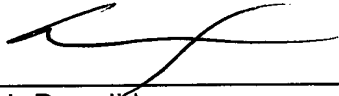
Applicants acknowledge the Examiner's indication in the Office Action that claim 6 contain allowable subject matter. Amendments were made to claim 6 to place it in condition for allowance. Therefore, claim 6 is allowable as indicated by the Examiner.

In view of the foregoing amendments and remarks, applicants submit that claims 1-8 and 11 are in condition for allowance. Accordingly, early allowance of claims 1-8 and 11 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (TMI-5038).

Respectfully submitted,

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